DOCUMENT RESUME

ED 346 840 IR 015 595

AUTHOR Woodruff, Ernest; Heeler, Phillip
TITLE A Computer-Based Tutorial System To Develop Listening Skills Using CD-ROM.
PUB DATE 3 May 91
NOTE 7p.; Paper presented at the Joint Conference of the Educational Computing Organization of Ontario and the International Conference on Technology and Education (Toronto, Ontario, Canada, May 3-10, 1991).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; Computer Assisted Testing; Computer Software Development; Higher Education; Individualized Instruction; Instructional Design; *Interactive Video; Learning Modules; *Listening Skills; Microcomputers; Music Appreciation; Music Education; Objectives; *Optical Data Disks; Teacher Developed Materials
IDENTIFIERS Workstations

ABSTRACT

Perceptive listening is obviously crucial to the musical experience. Developing perceptive listening in students of widely varying levels of aptitude and achievement is a great challenge for any music teacher. Efforts must be individualized to be effective, and computer-based instruction provides the necessary tools for individualization. The incorporation of CD-ROM into a tutorial environment gives the student an opportunity to explore a vast quantity of music in a structured setting. A tutorial was constructed for an IBM-compatible microcomputer with CD-ROM and videodisc players attached. The tutorial, which was written in Microsoft QuickBASIC, tracked learner performance and provided remediation on various aural (listening) objectives given to college music appreciation students. (5 references) (Author/BBM)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED346840

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

# A Computer-based Tutorial System to Develop Listening Skills Using CD-ROM

Ernest Woodruff and Phillip Heeler*

## Abstract

Perceptive listening is obviously crucial to the musical experience. Developing perceptive listening in students of widely varing levels of aptitude and achievement is a great challenge for any music teacher. Efforts must be individualized to be effective, and computer-based instruction provides the necessary tools for individualization. The incorporation of CD-ROM into a tutorial environment gives the student an opportunity to explore a vast quantity of music in a structured setting. A tutorial was constructed for an IBM-compatible microcomputer with CD-ROM and videodisc players attached. The tutorial tracked learner performance and provided remediation on various aural (listening) objectives given to college music appreciation students.

## Introduction

According to Reimer (ref 1), a philosopher in the field of music education, a musical experience is one in which the listener perceives tonal relationships - melody, rhythm, etc. - and then reacts to their expressiveness. If one accepts this premise, it is obvious that a necessary part of the experience of music relates to the ability to perceive tonal relationships in the music. Therefore, an important goal of a music educator must be to facilitate the improvement of listening perception.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Ernest R. Woodruff
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."



BEST COPY AVAILABLE

1201595

In a previous study the authors sought to determine whether or not the taking of computer-administered aural (listening) tests using interactive videodisc technology would influence the acquisition of listening skills in college music appreciation students (ref 2). While the testing program was successful, some problems did arise. One of the findings of this previous study was that a number of students attempted aural tests as high as seven times without achieving a passing grade.

Assuming that a cause of the high failure rate among some of the students was related to their lack of skill in self-directed practice and study, a means was sought to track learner response on these aural tests and provide remediation in a tutorial setting. In an attempt to construct the most effective tutorial possible the authors have consulted** previous research in the fields of teaching machines and programmed instruction.

Skinner (ref 3), who has been a leading proponent of programmed instruction and teaching machines, states that "the small computer is the ideal hardware for programmed instruction. It is not functioning as a computer, of course; it is teaching and should be called a teaching machine. A machine that teaches by arranging contingencies of reinforcement is a teaching machine."

Teaching machines have been a part of the delivery of instruction for many years. Pressey (ref 4), one of the most active developers and proponents of teaching machines early in this century, spoke of a need for an industrial revolution in teaching. Educators continue to realize the need to have

individual contact with students, but they have found that it is often not feasible. Teaching machines have helped provide more individualized instruction, and continue to do so in the environment of computer-based instruction.

Benjamin (ref 5) suggests that teaching machines could be defined as "an automatic or self-controlling device that (a) presents a unit of information, (b) provides some means for the learner to respond to the information, and (c) provides feedback about the correctness of the learner's responses." The authors have developed a computer-based tutorial system using interactive CD-ROM and videodisc that not only meets the above criteria of a teaching machine but also tracks learner performance and provides appropriate remediation.

Description of the Tutorial

The tutorial was designed to be used in a college music appreciation course taught by one of the authors. The syllabus for this course divided the aural (listening) objectives into five modules. Students were given credit for passing tests over the aural objectives based on achievement of a criterion score before a predetermined deadline. The purpose of these module tests was to encourage the mastery of the aural objectives. The level of mastery was determined by unit exams given in class.

Since a criterion score of 85% was required for students, the aural tests were taken repeatedly until that score was achieved. An interactive videodisc workstation that was developed by the authors (ref 2) for a previous study was used because multiple versions of the module tests could be produced

easily. If students did not pass the aural test then a tutorial was administered.

The creation of a tutorial presented a two-fold problem to the authors. The first problem addressed was the selection of hardware capable of presenting randomly accessed musical examples. The second problem was the design of tutorial software that would facilitate the learning of the aural objectives.

Hardware

The hardware for the interactive videodisc workstation that was used to administer the aural tests consisted of an IBM compatible microcomputer connected to a Pioneer LDV-6000 videodisc player which used a custom-made videodisc. To avoid the need of producing more custom-made videodiscs, CD-ROM technology was selected for the tutorial. The advantage of CD-ROM is its ability to produce high-quality audio and at the same time provide random access to a vast quantity of musical selections contained on compact discs. A Hitachi 1503S CD-ROM player was connected to the same IBM compatible microcomputer using an interface card. Special BASIC routines were incorporated into the tutorial program to search and play locations on the compact discs.

Software

The authors designed the tutorial program to use information gained from the students' results from the aural test program so that appropriate remediation could be provided. The testing program was designed to meet three requirements. Firstly, it had to be able to generate a different version of the module test

each time a student attempted it. Secondly, it had to produce one and only one question for each objective of the module test. Thirdly, it had to be able to choose at random a different musical selection for each objective and play this selection. These requirements were achieved in a five-hundred-line program written in Microsoft QuickBASIC.

Separate files for the aural objectives, test questions, and tutorials were created. The objective file contained single line statements describing each objective. The test question file contained the questions and answers for each objective and special frame numbers indicating which locations on the videodisc were to be played for that specific question.

A master student data file was also used to store student results from the module test and tutorial. This file included personal identification information as well as aural test results, missed objectives, date and time when the test was taken, and an indicator to show whether the student had completed the accompanying tutorial.

After students had taken an aural test and had not achieved the criterion score of 85%, they were required to take the accompanying tutorial. Based on the model given by Benjamin (ref 5), the authors designed a tutorial program to facilitate the learning of musical objectives in the following ways: (a) for each missed objective, a unit of information was retrieved from the tutorial file and presented on the screen, (b) a musical example appropriate to this objective was retrieved from the compact disc and played for the student, (c) the program

evaluated the learner's response, and (d) provided remediation as necessary until the objective was mastered. Once an objective was mastered the program proceeded on to the next objective until the tutorial was completed. After successful completion of the tutorial, the student was allowed to take the aural test again.

*Ernest Woodruff, Phillip Heeler, Northwest Missouri State University, Maryville, Missouri, U.S.A.

References

1. B Reimer, A Philosophy of Music Education (Prentice-Hall, Englewood Cliffs, NJ, 1989) p 128.

2. E Woodruff, P Heeler, Proceedings NECC '90.

3. B F Skinner, Educ Digest 52, 16 (1987).

4. L T Benjamin, Amer Psych 43, 707 (1988).

5. L T Benjamin, Amer Psych 43, 704 (1988).